

# The what and where of operant self-learning mechanisms in *Drosophila*

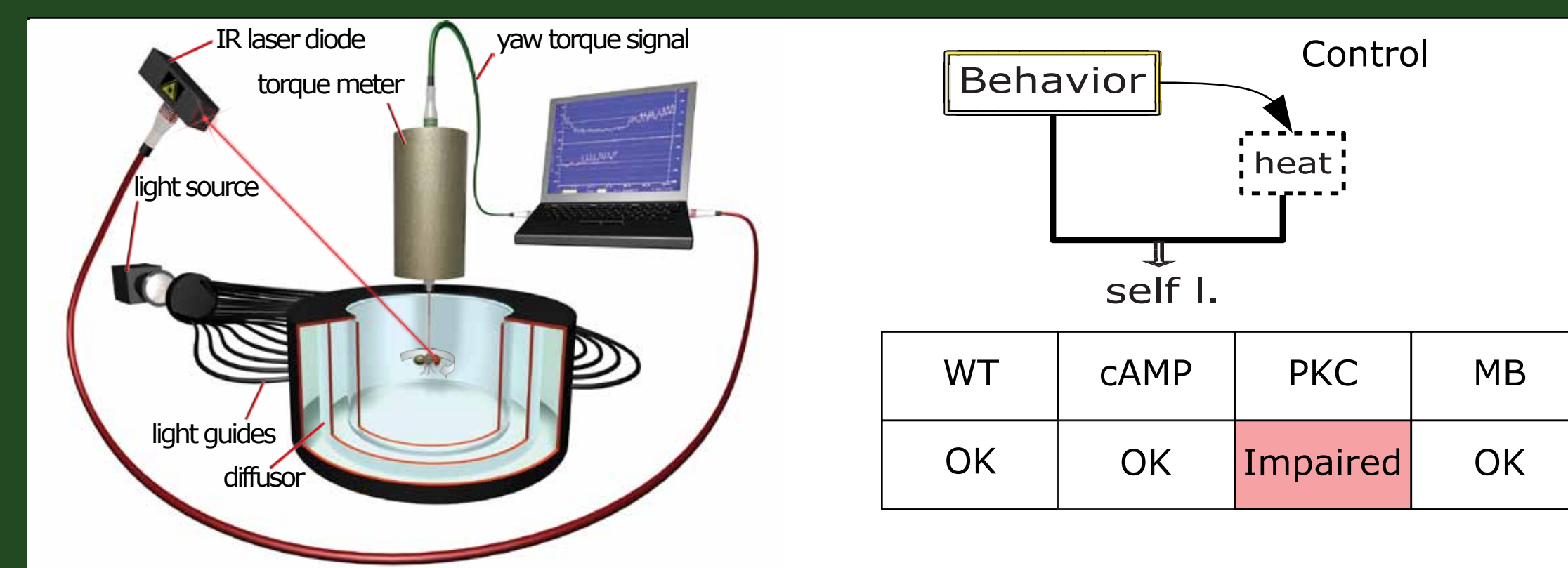
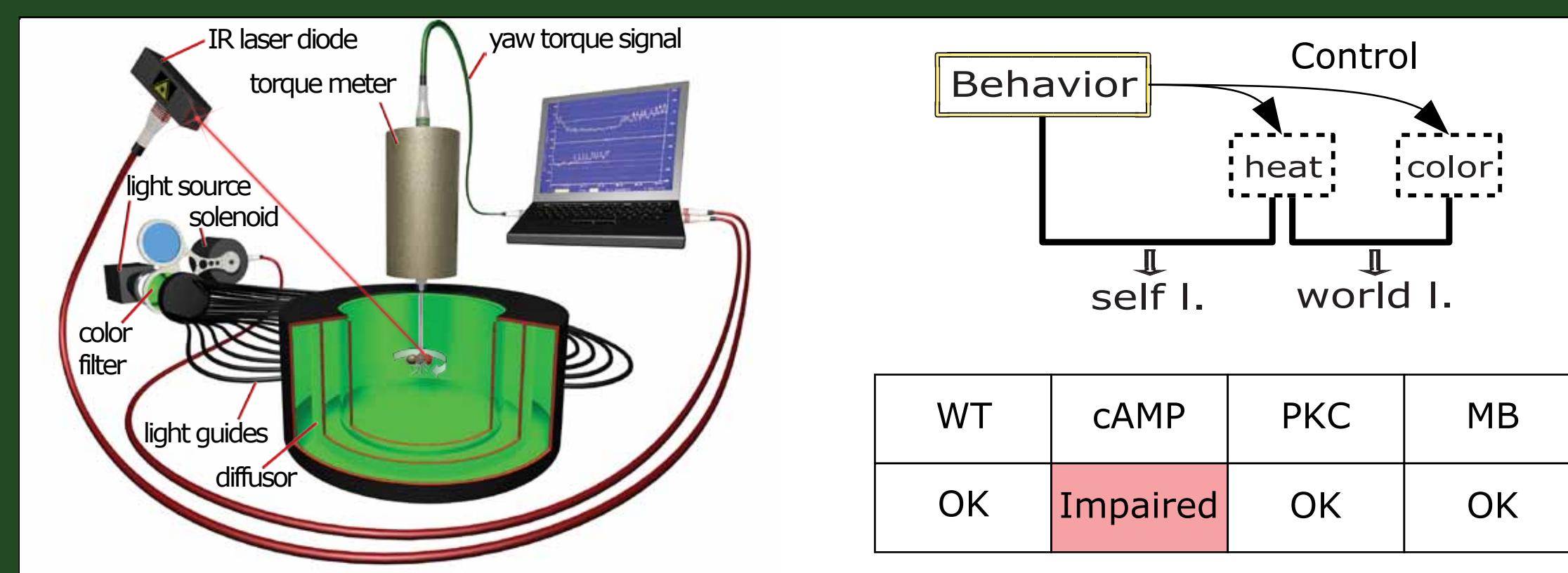
P 279



Julien Colomb, Ezequiel Mendoza, Diana Pauly, Sathishkumar Raja, Björn Brembs  
Freie Universität Berlin, Institut für Biologie - Neurobiologie, Berlin, Germany  
bjoern@brembs.net, <http://brembs.net>

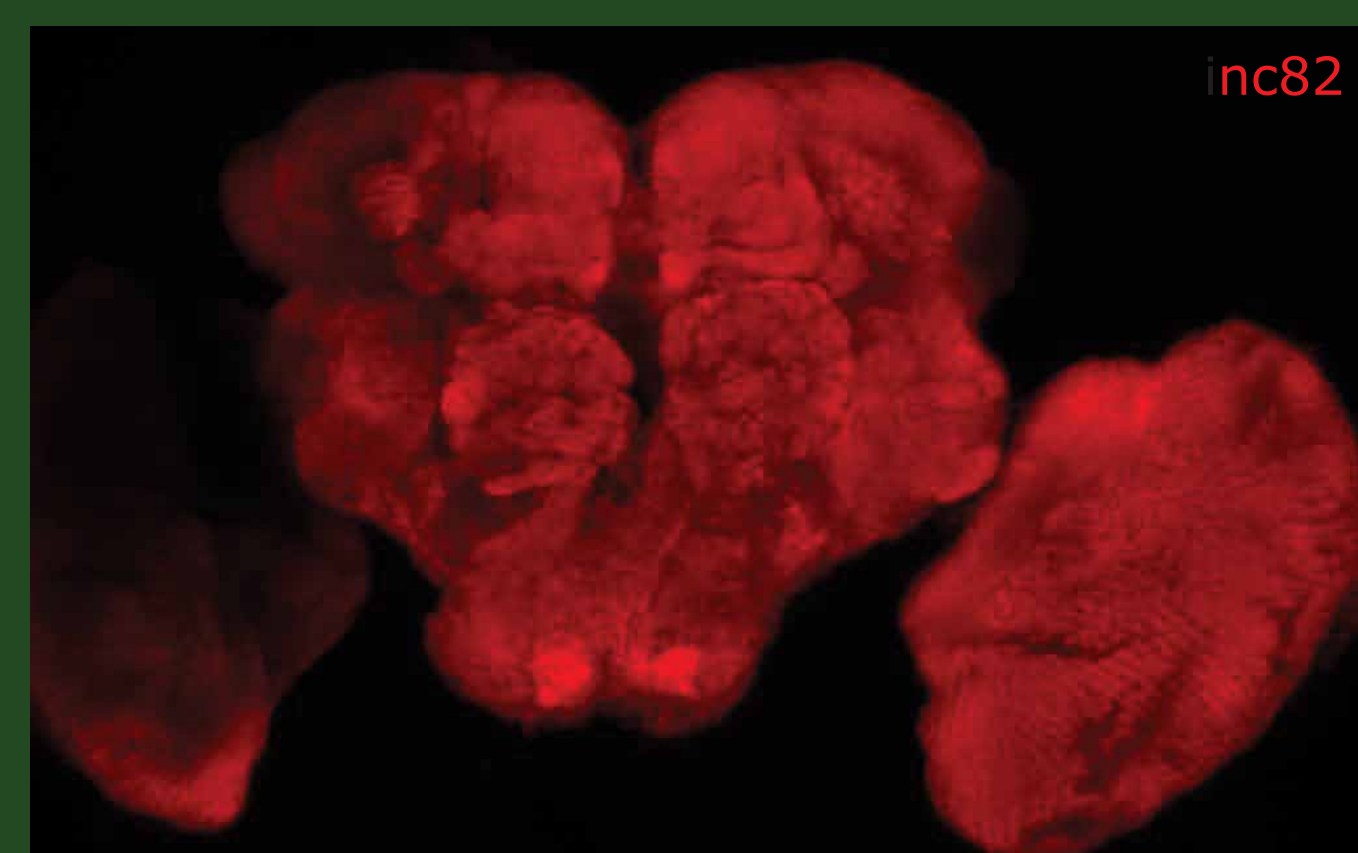


## 1. PKC activity is required specifically for self-learning



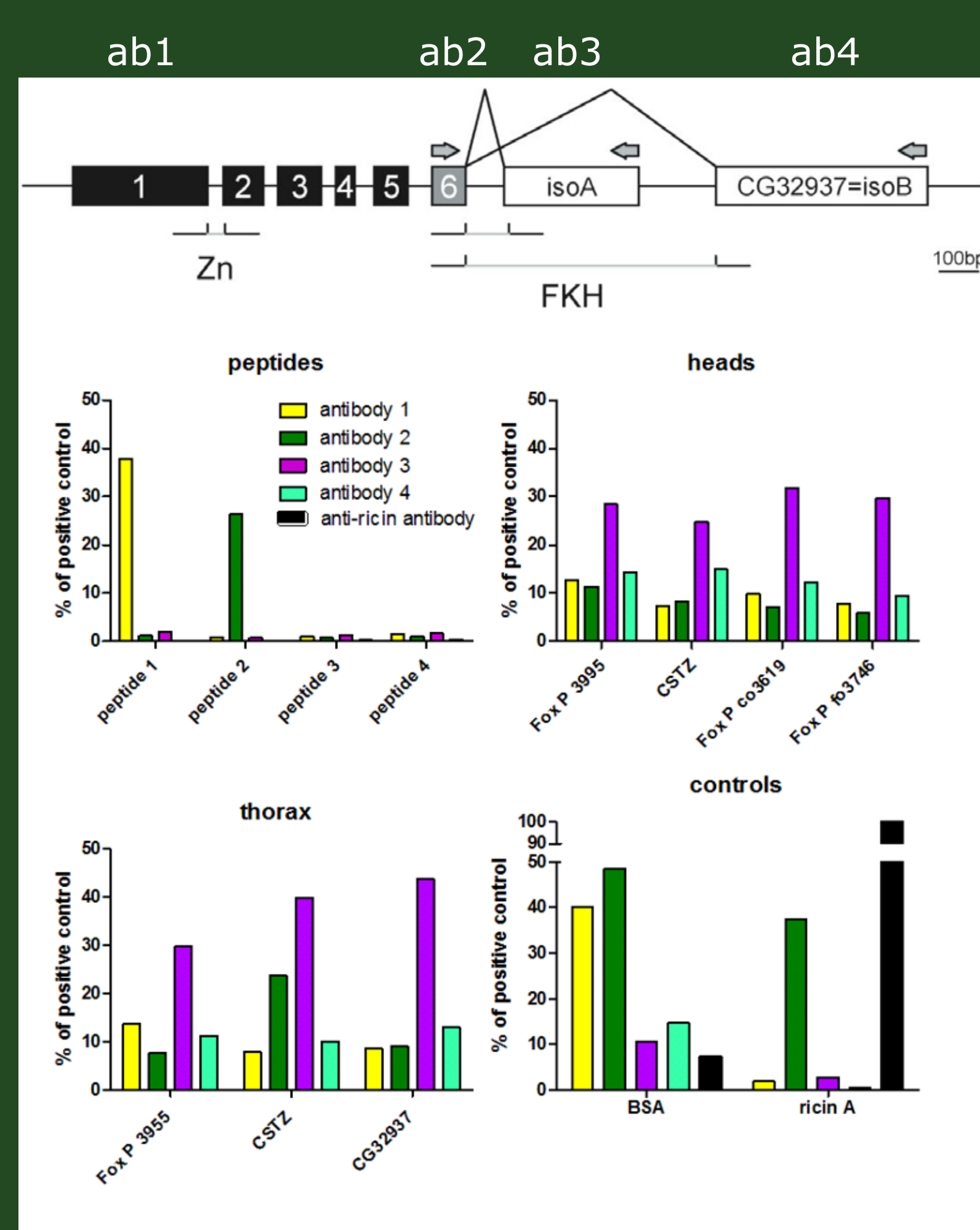
**Fig. 1:** Two operant conditioning experiments, distinguished by the presence or absence of predictive stimuli. Above: Flies learn to avoid the heat associated with one of two colors and left or right turning, respectively. Manipulating cAMP levels abolishes learning in this task. Below: Removing the color stimuli leaves the animal with only its behavior as predictor of heat punishment. Manipulating PKC abolishes learning in this task. Brembs & Plendl, Curr. Biol. 2008

## 6. No obvious brain defects in FoxP mutants



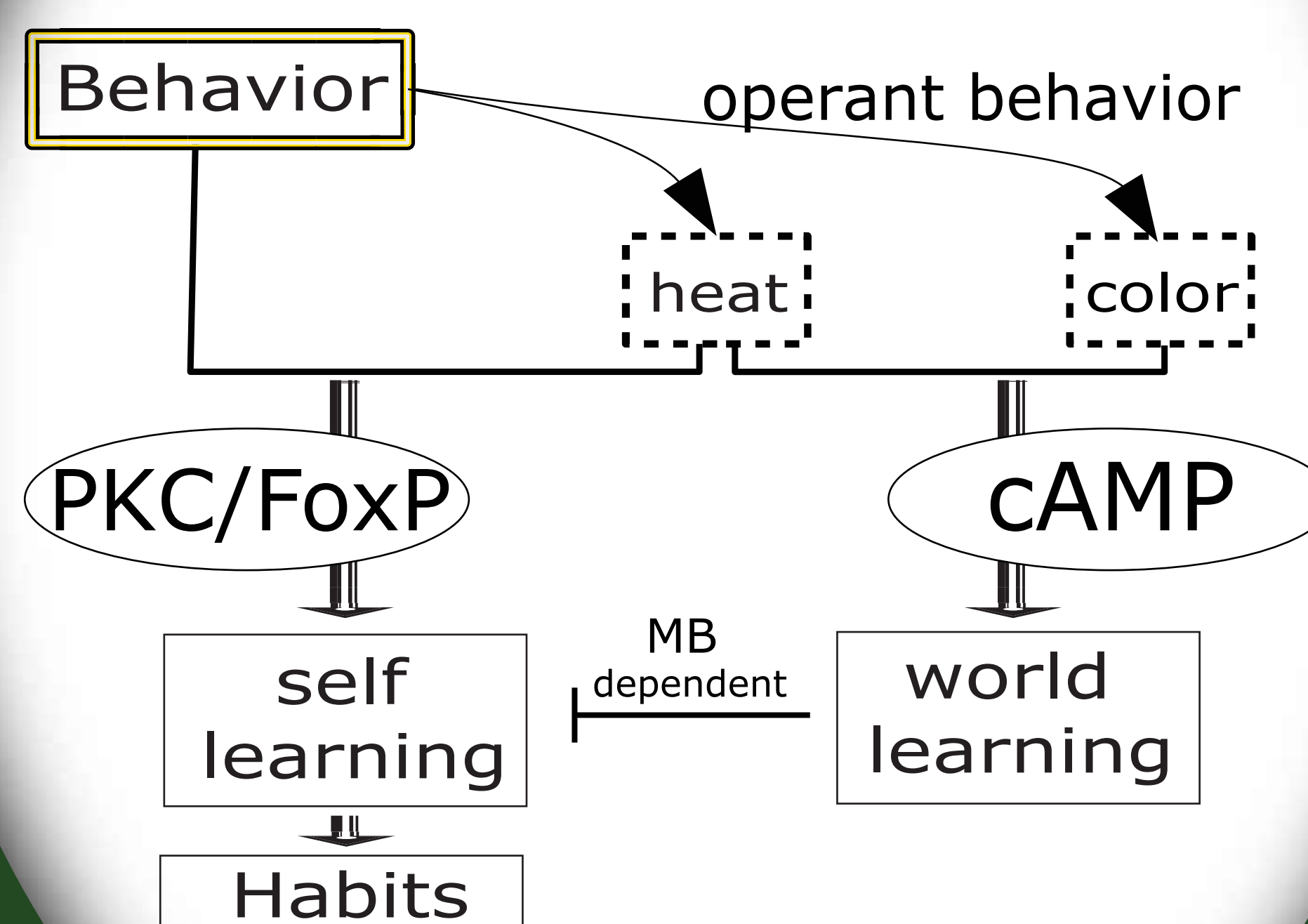
**Fig. 6:** FoxP mutant brains do not seem to be obviously malformed. A quantitative anatomical analysis searching for more subtle defects is currently under way.

## 5. Developing antibodies against *Drosophila* FoxP

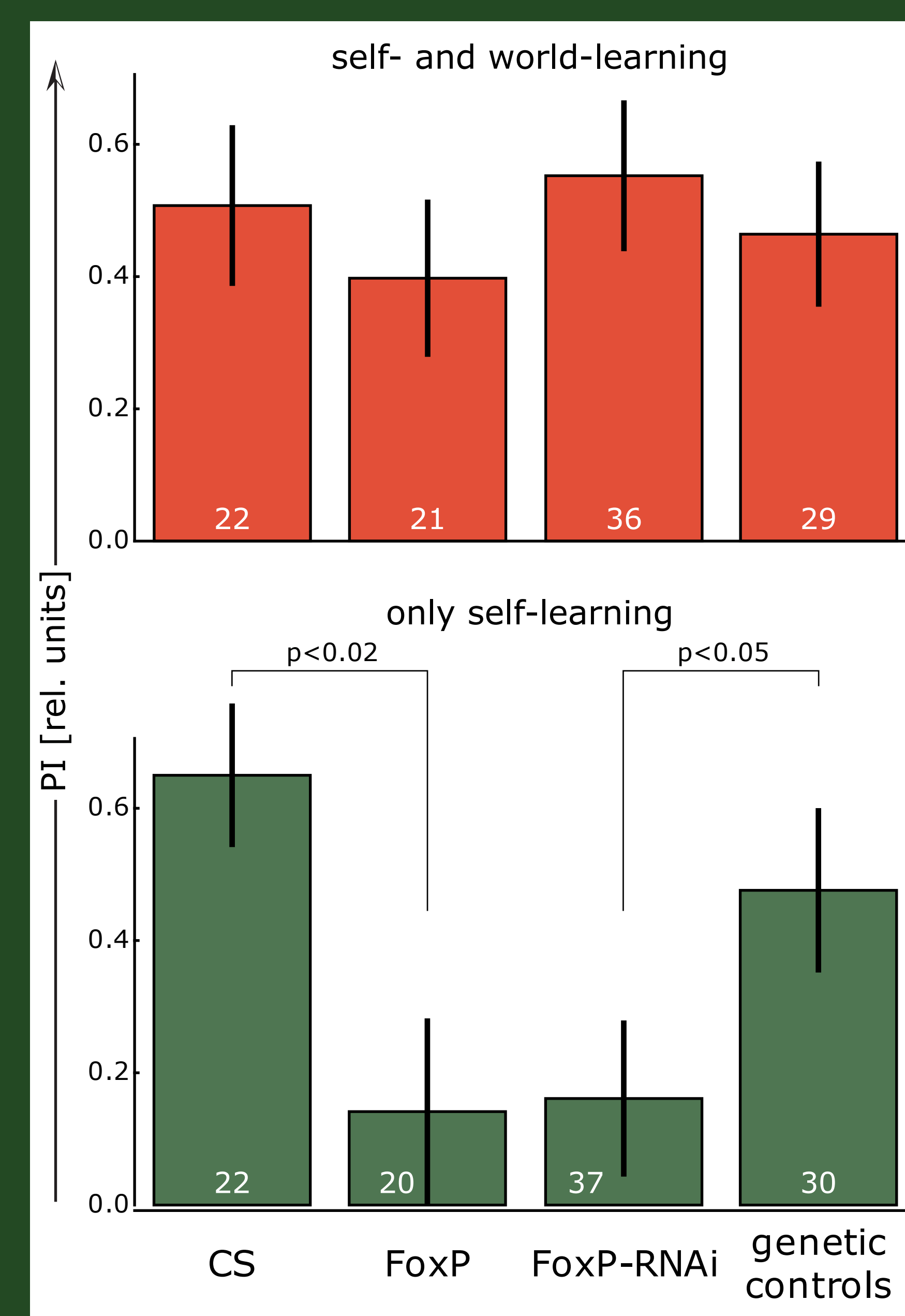


**Fig. 5:** ELISA results after seven immunizations of four chicken immunized with peptides from different regions in the FoxP sequence. No specific immunoresponse, yet.

## Self-learning and world-learning

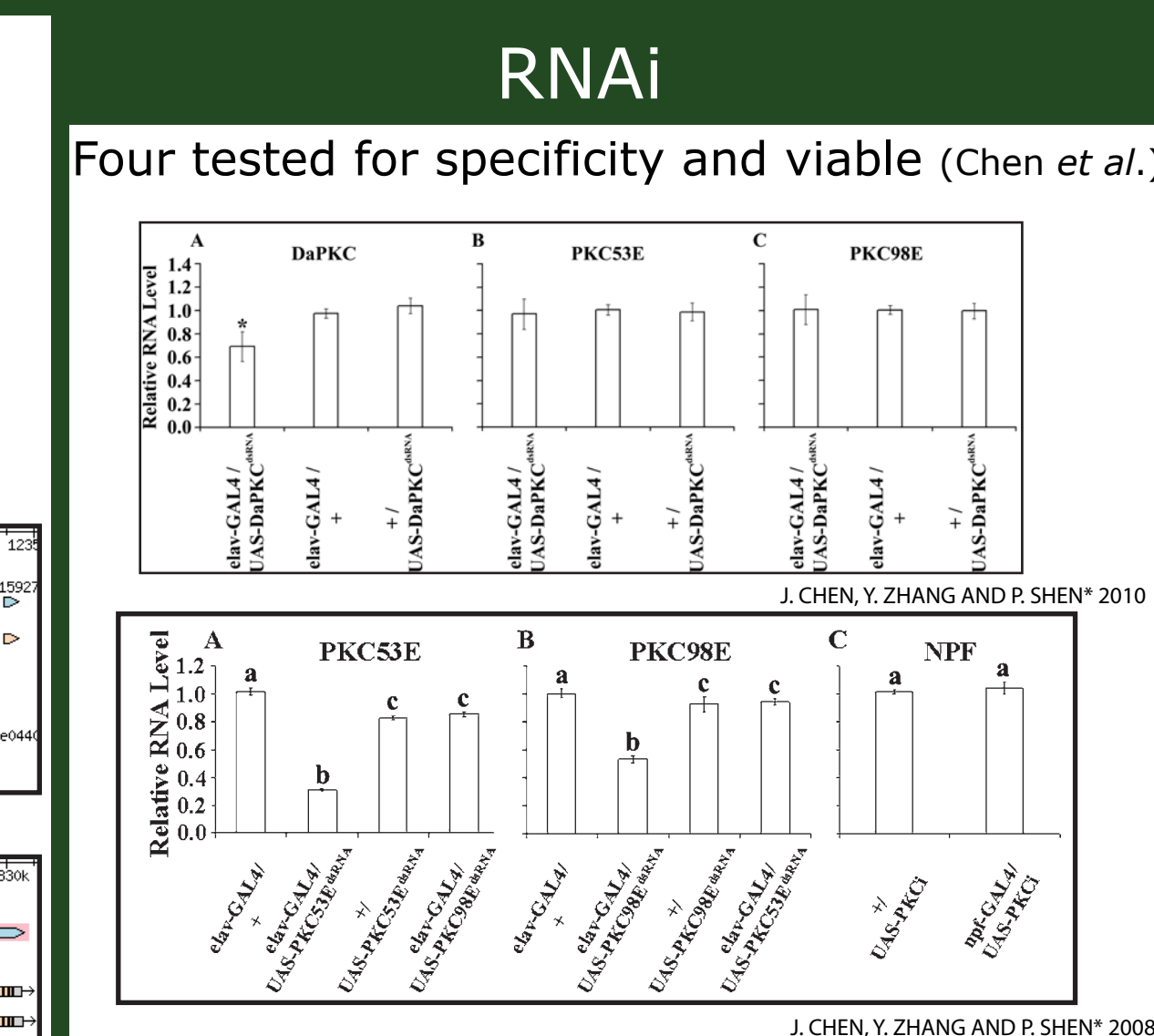
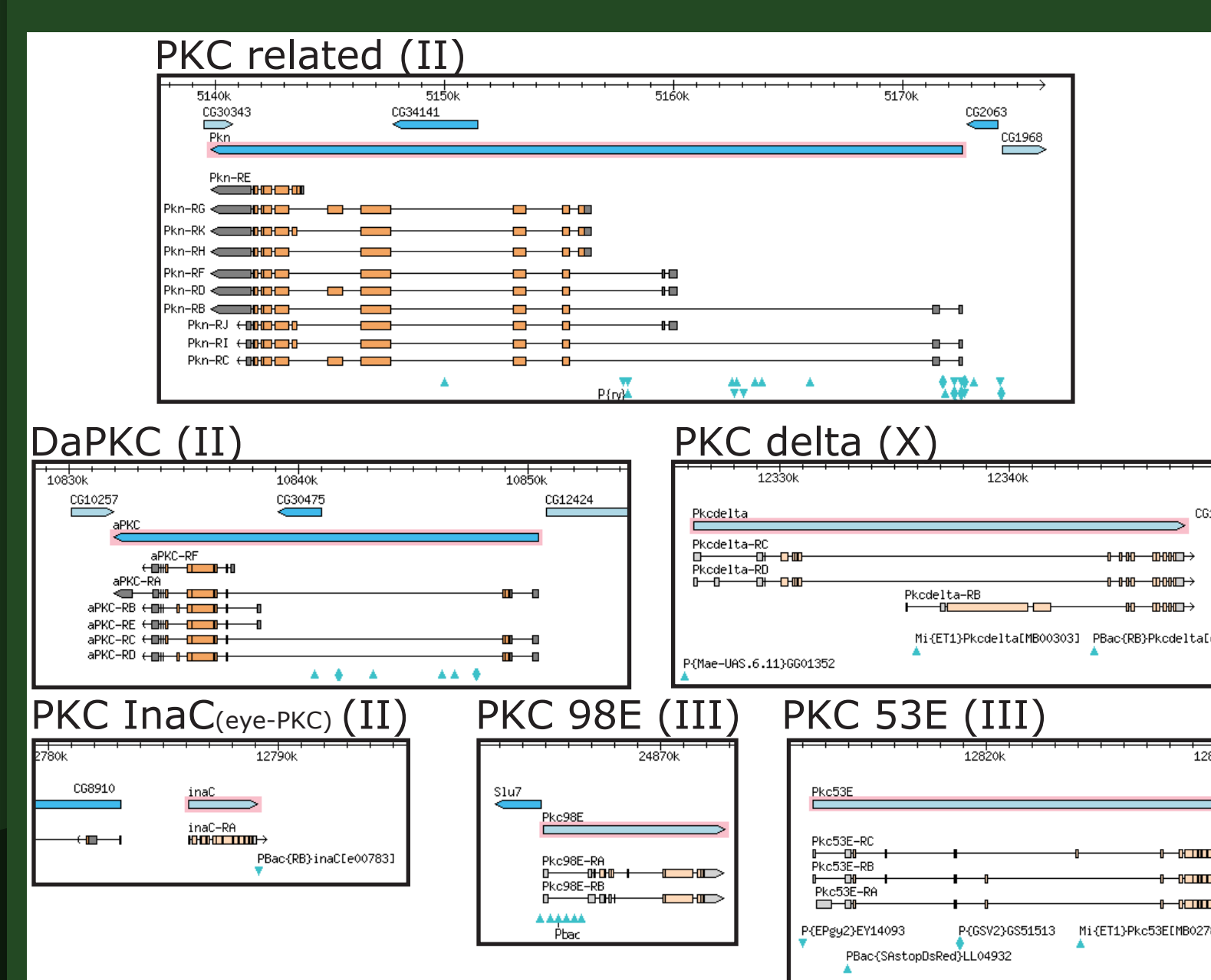


## 2. *Drosophila* FoxP is required specifically for self-learning

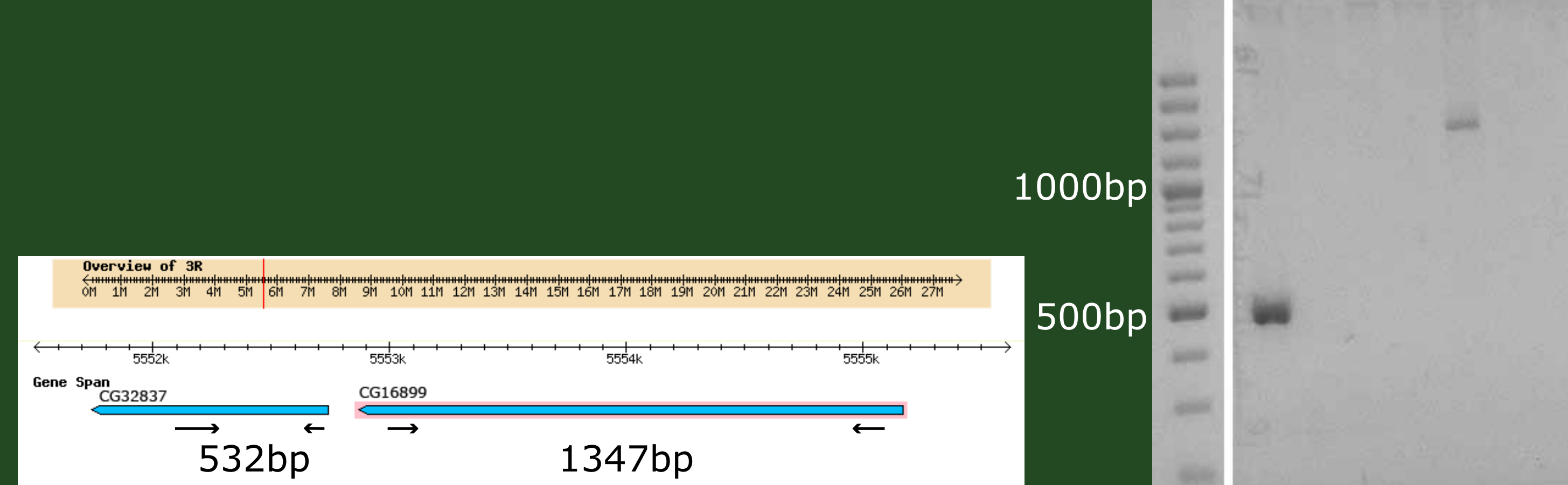


**Fig. 2:** FoxP function dissociates between self- and world-learning. Canton S and genetic control lines perform well in both learning situations, whereas a FoxP mutant line and a FoxP RNAi line show significantly reduced learning scores specifically in the self-learning task.

## 3. Screening PKC isoforms Mutants



## 4. FoxP is not transcribed in the mutant line



**Fig. 4:** Primer pairs directed against each of the two FoxP isoforms (left) do not lead to any amplificate in the FoxP mutant line.

6 putative mutants:  
2 homozygous lethal, 1 not flying  
1 in outcross  
2 tested: no defect

**Fig. 3:** We are currently in the process of screening various mutant and RNAi lines affecting different PKC isoforms. Two viable, flying mutant lines have been tested in self-learning and are not impaired.